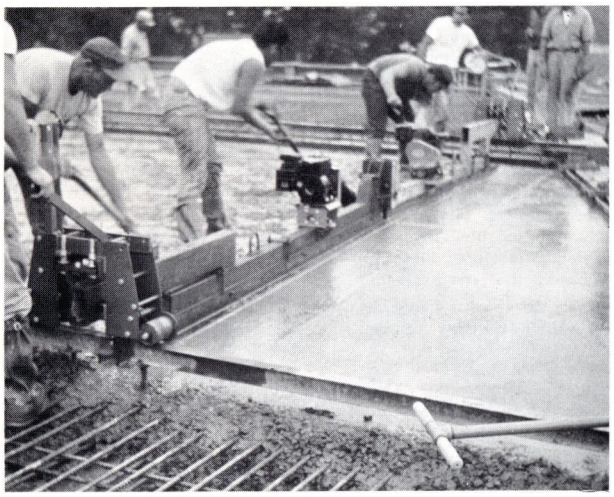
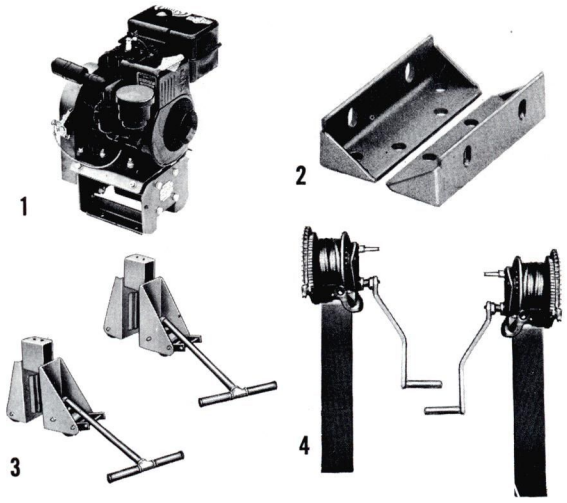
HOW TO STRIKE OFF CONCRETE BY VIBRATION SCREEDING



Screeding bridge decks—Underslung beam construction was required for this 30-foot span Stow SASG screed, since the rails were located above the surface of the concrete. Bridge deck 90 feet wide. Since they were required to pour and strike off half the width as a monolithic slab, they also used a 15 foot screed at the same time.



Stow JSA vibrating screed assembly available for contractors who want to build their own beams. Consists of item (1) a 3 HP adjustable amplitude vibrating unit, item (2) brackets for engine mounting, item (3) a pair of end rollers, handles and necessary bolts, item (4) 9:1 ratio winches.

How To Strike Off Concrete by Vibration Screeding

A vibrating screed is used to strike off concrete surfaces and at the same time vibrate the concrete. Because of the vibration, stiff concrete (even two inch slump or less), can be placed and struck off more efficiently and economically than by hand methods.

A vibrating screed consists of an adjustable amplitude vibrating unit mounted on a beam, a pair of end rollers and handle assemblies and 9 to 1 ratio winches. The vibration is transmitted through the length of the beam directly to the concrete. There is no traverse movement of the beam. The screed is merely drawn directly forward with the end rollers riding on the forms. The Stow screed can be obtained either complete with steel beam or as a package assembly without the beam. Complete directions are shown in Stow's Catalog for building your own wooden prestressed screed beam.

Advantages of Vibrating Screeds

A Stow vibrating screed, because it does not have transverse movement, permits the building of any reasonable crown or grade into the bottom of the beam to conform to the requirements of the slab.

Vibrating screeds not only strike off the surface and shape it as they are advanced, but they vibrate the concrete at the same time. This means that all of the advantages of vibration are obtained, such as greater density and compaction of the concrete. Because of the vibration, a much stiffer mix can be struck off (two inch slump or less is recommended). Such stiff mixes are highly impractical to handle by hand methods. A stiff mix, of course, makes a much stronger concrete. Stow vibrating screeds have rubber vibration dampers between the end roller assemblies and the beam which rides slightly above the forms. This practically eliminates vibration from being transmitted to the forms.

A means is provided to make it simple to raise the beam up slightly off the surface. On the Stow screed a lever is provided on the handle and roller assembly which, when pushed down, lifts the beam up 1½ inches away from the concrete. This is important since it makes it simple to roll the screed back for a second pass. It also makes it possible to stop the screed at any time without any danger of over-vibration.

Stow screeds are easily moved across the slab by the use of 9:1 ratio winches. Thus, only two men are required to operate the screed regardless of its length. The screed moves more evenly leaving a much smoother surface than if it were just pulled by handles in the conventional method.

Not only do vibrating screeds produce a better slab but they save the contractor a considerable amount of money because of the speed at which they operate. Experience has shown that, with the same crew, a contractor, even on concrete bridge decks, can often cut his production time almost in half. Also, of course, vibrating screeds are much less fatiguing to operate than back-breaking hand strike-off methods.

Where used—The Stow vibrating screed is especially recommended for floors, precast slabs, bridge decks, airport aprons, flood walls and short sections of highways.

Screeds are ideal for large floor areas, except in cases where there are too many obstructions sticking through the finished slab. Since stiffer concrete can be struck off with the Stow screed, the concrete will set up faster. This means that rotary troweling can start sooner for final finishing.

Large highway paving machines cannot be used economically on small sections of concrete highways or on bridge decks. In many cases, these slabs are hand finished using a soupy mix. This results in poor concrete surfaces that mean high maintenance costs and disgruntled highway engineers. With Stow vibrating screeds, however, a smooth surface can be struck off using **stiff** concrete. Usually the resulting surface is smooth enough so that very little bull floating is required.

Now, how much faster is a vibrating screed than hand screeding? One contractor said he screeded with a Stow screed on bridge decks for the Massachusetts turnpike **"twice as fast as we've ever done by hand".**

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Procedures for Screeding

On Floors

Whether wooden or steel forms are used they should be securely anchored so that they will not settle due to the weight of the screed. The actual type of form is not too important as long as there is a suitable surface for the rollers to ride on. "I" Beams, two-by-fours, pipe, and sidewalk forms are some of the most popular. A large area often can be divided into equal width lanes so that the same length vibrating screed can be used on the entire surface. In most cases, the top of the form is on the same level as the concrete surface so that a straight beam can be used. Crowned beams can be used if desired. To help in keeping the rollers on the rails, flanged rollers are available as optional equipment.

If there are upright columns already in place, the forms should be located right at the columns, if possible, so that the screed can easily be lifted around the columns (see illustration of IBM job below). Longer screeds have certain advantages over short ones. By using a long screed, considerable time is saved both in the actual screeding operation and in placement of forms.

Screeds up to 50 ft. are available. For long screeds (screeds of 30 ft. to 50 ft. in length) a hinged joint assembly is built into the center of the screed which allows for a 3 inch crown adjustment. (This is also available on shorter spans where a large crown adjustment is needed.)

Before screeding starts check the bottom of the screed beam to see that it is perfectly straight or has the specified crown.

Stow's steel screeds have a double flange on the bottom which may be used to maintain the correct crown and which also gives two vibrating surfaces—"like making two passes at once."

After placing the screed on the forms or rails, concrete is poured 15 to 20 feet ahead of the screed and raked to a height slightly higher than the forms. Then the vibration is started up and the screed is pulled forward by two men turning the winch handles. The number of vibrations per minute can be controlled by adjusting the throttle.

The amplitude of vibration (or wallop) of the power pak is adjusted easily by changing the position of the eccentric.

It may be found that intermediate vibration speeds and amplitudes are more desirable for particular mixes or different length beams. Generally the stiffer the mix and the longer the beam the greater is the vibration speed and amplitude required. Also, the speed at which the screed is pulled along will affect the results. After only a few minutes of operation a satisfactory vibration speed and pulling speed can be found. After making the first pass (15 or 20 feet) the beam is lifted up off the surface of the concrete. Looking back over the first pass, there may be a few low spots where the concrete was not quite up to the level of the screed. A few shovels full of concrete will fill in these spots. Then the screed in its raised position can be rolled back to its starting position and a second pass made. After screeding is finished and the concrete has set up, Stow Roto-Trowels can be put on the job for final finishing.

On Highways and Bridge Decks

The procedure for screeding short sections of highways is similar to that used for floors. After screeding, the surface is ready for final finishing per specifications.

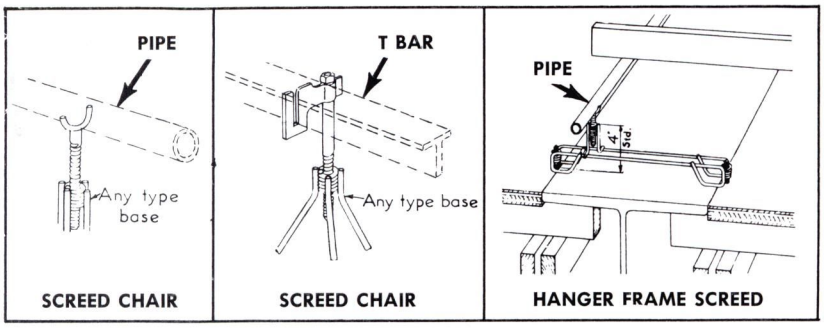
Different length vibrating screeds with spans up to 50 feet have been used successfully on bridge decks on the New Jersey, New York, Massachusetts, and Ohio Turnpikes, as well as many others. On these bridge decks, the exact height and spacing of the rails that the screed rollers ride on is important to maintain the proper finished grade and specified thickness of the slab. These rails are often located above the surface of the concrete, allowing the concrete to be poured underneath them. The weight of the concrete will cause some deflection in the forms for the slab. Therefore, these rails are also located over points of no deflection so that the surface of the slab will be true in relationship to the supports for the bridge. In this case offset (or underslung) type beam construction can be used. The contractor can make his own beam or give Stow a sketch showing the exact relationships between the surface to be screeded and the rails that the rollers ride on.

Practically all states now specify that vibration be used on concrete bridge decks. Vibrating screeds, of course, meet this stipulation. Some states specify that their bridge decks should be single surface decks while other states specify a riding surface deck. On a riding surface deck, the first thickness is poured, and then a topping of about two inches of concrete or asphalt is poured over it. The lower thickness of a riding surface deck should be finished with a vibrating screed also, for if it is not flat and smooth the top surface will not remain flat under traffic.

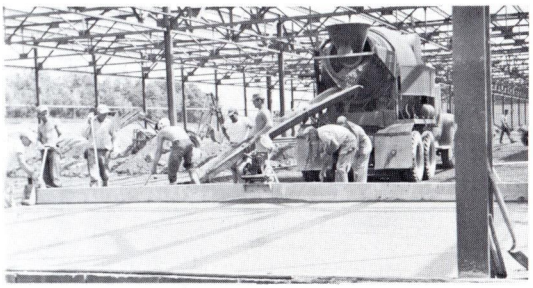
Monolithic Slabs

Where the required span is greater than 50 ft. and must be without seams, it can be sectionalized in the following manner. Pipe can be supported on screed chairs at the level of the slab. Then when both slabs on either side of the pipe have been screeded, the pipe is pulled out and the surface touched up by hand. As long as both slabs are poured the same day, the combined surface is a monolithic slab.

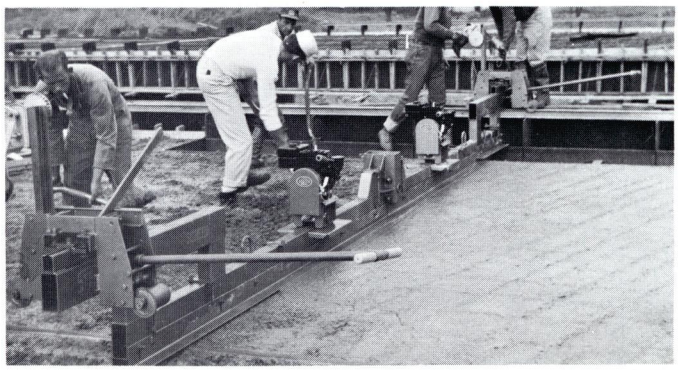
On bridge decks various methods are used to support the pipe or rails for the screed to ride on. Below are a few sketches of typical "screed chairs" and "hanger frame screeds". These adjustable supports make it simple to get the exact height required for the rails.



Typical methods for supporting rails on bridge decks.



Stow Screed, 25 feet 5 inches long, striking off floor on new IBM plant. The entire plant was laid out in equal width lanes so that the same length screed could be used throughout.



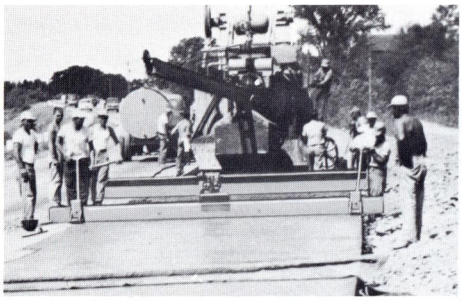
Special underslung end arrangement for bridge deck — 28 ft. screed with twin power paks and adjustable hinge joint assembly and winches. Note that beam itself is riding on a pipe in center of bridge.

Two-hundred by four-hundred ft. warehouse floor being struck off with Stow screed. Note winches.

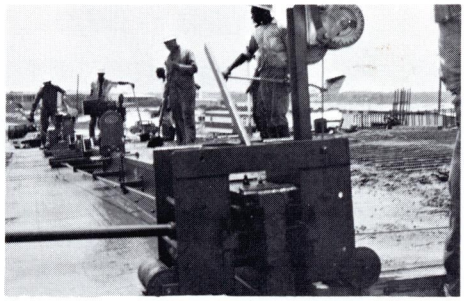
Striking off 10 ft. span by hand methods. Note that 4 men are needed for this rough work.

Screeding Bridge Deck—Stow special 24-foot, 6-inch vibrating screed finishing outer lane. "I"-beam rail at far end is mounted above the parapet reinforcing.

20 ft. steel screed being used to finish one half of bridge deck at a time. Note rollers were moved in since span was only 16 ft.



Screeding a new third lane on a hill with 14 foot screed. Burlap was pulled along after screed to roughen surface.



50 ft. screed on bridge deck showing bracing arrangement used on extremely long screeds to prevent bowing. Long screeds also come equipped with twin power paks.

13-foot screed on two lane bridge. (Note that a pipe was used for the rail in the middle.)

Special Applications

Here are some examples of special applications of screeds that give an idea of the variety of uses a Stow screed can be put to.

Fig. 1—Shows a highway widening job on which the new slab was several inches higher than the existing center pavement. This meant that wooden forms had to be used on the left side as shown in the photo. The contractor knew that the wooden forms would never hold up under the heavy weight and crosswise motion of his large self-propelled machine. Therefore, he used a 10 foot Stow screed, which did an excellent job.

Fig. 2—Shows two power paks on a 15 foot screed on a 1½ to 1 slope flood wall where one inch slump concrete was poured. Because of the steep slope the beam was attached by an eyebolt to a power winch on a tow truck. Special mounting brackets were used so that the engines would be vertical. They only made one pass and did eight sections a day.

Fig. 2

Fig. 3—A contractor needed a vibrating attachment for his concrete road spreader to meet state specifications. Rather than buy the standard vibrating attachment that could be obtained for this spreader the contractor decided he could get the same effect at a much lower cost by attaching a 12-foot Stow screed to this spreader. This was accomplished easily. The screed was furnished with eyebolts on the top of the end roller assemblies. He rigged up a hydraulic lift arrangement that lifted the screed by chains attached to the eyebolts. When lowered into place on the forms the Stow screed was just pulled ahead by chains attached from the front of the rollers to the spreader. After striking off the concrete a road finishing machine put the final finish on the slab.

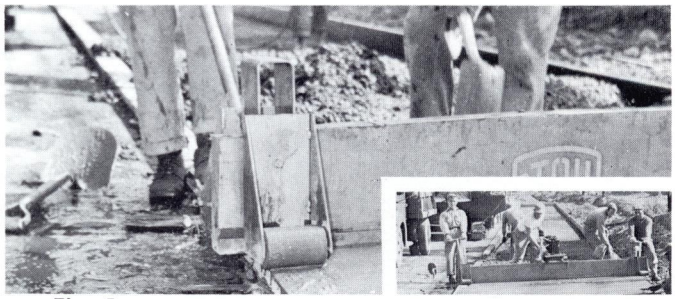


Fig. 1

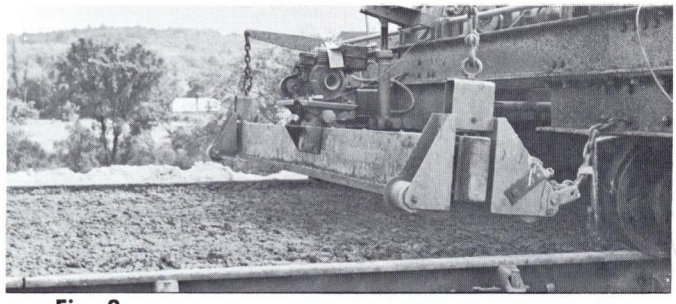
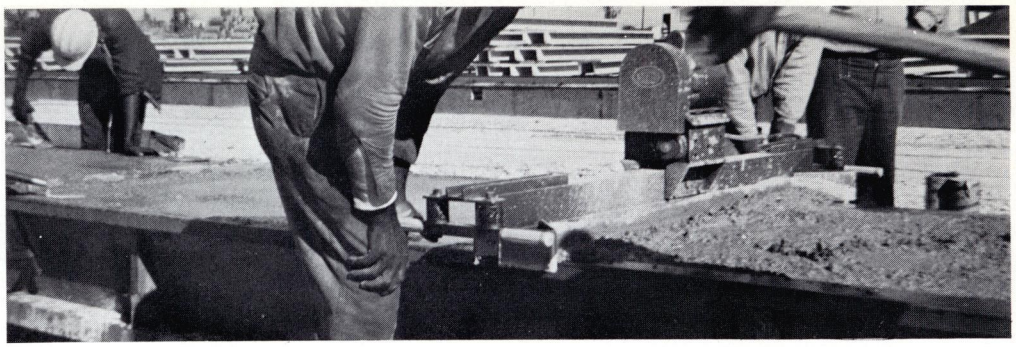
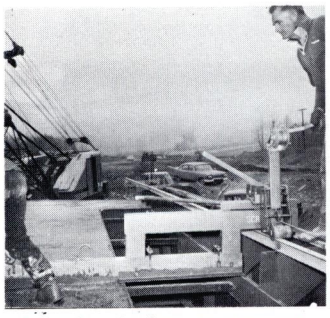


Fig. 3

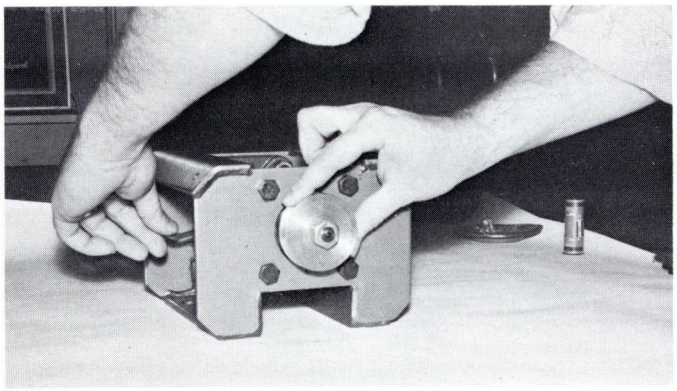
Prestressed steel screed — For narrow slabs (up to 8 ft. for SLE screed and 12 ft. for SLG screed). It is similar to the longer screeds having an all steel beam, double flanges, adjustable amplitude power pak; however it does not have roller assemblies or winches. It is ideal for striking off sidewalks and narrow prestressed concrete beams. These screeds are available with either straight or curved handles. The SLE screed has electric power pak and the SLG screed has a gasoline power pak.



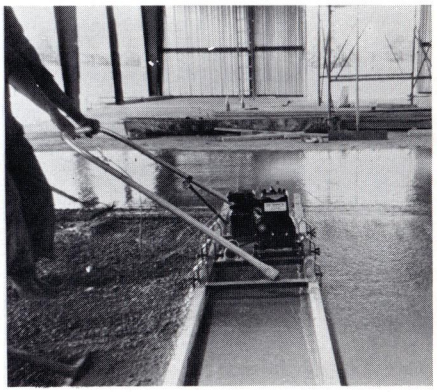
SLE screed with straight handles on prestressed beam practically walks by itself while operators guide it.



Special underslung arrangement 9:1 ratio winches and heavy duty flanged rollers on bridge deck. Note special flanges on end can raise up 2″ to clear grates.



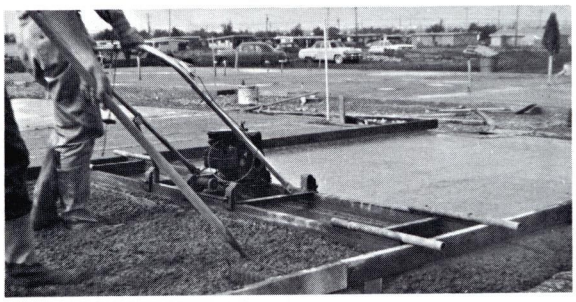
Adjusting amplitude with dial control



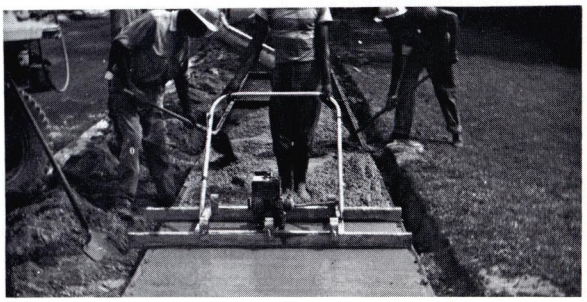
New Stow lightweight low-cost Porto-Screed mounts on 2 x 4's.

PORTO-SCREEDS ON THE JOB

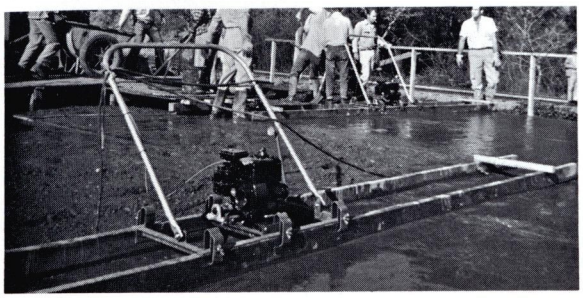
BELOW ARE SOME PHOTOS OF THE NEW LIGHTWEIGHT PORTO-SCREED ON A VARIETY OF JOBS.



Used with 10-foot underslung beam . . . struck off 10′ x 30′ slabs in 20 minutes.



Used on sidewalks. . . contractor estimated he saved 50% of finishing cost.



Two Porto-Screeds with 20-foot beams used on 35-foot wide bridge deck.

Two Porto-Screeds, mounted on 25-foot beam made from roof trusses, cut finishing time by 50%.

Two Porto-Screeds mounted on 28-foot aluminum beams strike off the Verizanno Narrows Bridge, the longest bridge in the world.

For more information on Stow Screeds including dimensional diagrams for underslung beams, write for Complete Concrete Equipment Catalog.

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